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L4: Entry 1 of 2

File: JPAB

Jul 31, 2002

PUB-NO: JP02002210842A

DOCUMENT-IDENTIFIER: JP 2002210842 A

TITLE: METHOD AND APPARATUS FOR FORMING LAMINATED RUBBER MEMBER AND TIRE USING LAMINATED RUBBER MEMBER

PUBN-DATE: July 31, 2002

## INVENTOR-INFORMATION:

NAME

COUNTRY

OIWA, ISAO

## ASSIGNEE-INFORMATION:

NAME

COUNTRY

SUMITOMO RUBBER IND LTD

APPL-NO: JP2001010487

APPL-DATE: January 18, 2001

INT-CL (IPC): B29 D 30/52; B60 C 11/14

## ABSTRACT:

PROBLEM TO BE SOLVED: To efficiently and accurately form a laminated rubber member, which contains staple fibers oriented in the thickness direction thereof, from a rubber sheet having staple fibers oriented in its length direction.

SOLUTION: An intermittently fed rubber sheet Sg is cut while pressed to a feed surface 11S before and behind a cutting positions J by front and rear press means 13 and 14. The pressing surface 31S of the press piece 31 of the front press means 13 is set to a holding press surface 33 capable of bonding a cut piece G to raise the same and a next cut piece Gb is bonded through the preceding cut piece Ga bonded to the holding press surface 33 precedingly to be stacked.

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L4: Entry 2 of 2

File: DWPI

Sep 2, 2004

DERWENT-ACC-NO: 2003-114517

DERWENT-WEEK: 200458

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TITLE: Lamination rubber formation method for tire, involves making cut pieces of rubber sheet adhere mutually from press surface of elevatable press piece which presses rubber sheet intermittently

## PATENT-ASSIGNEE:

ASSIGNEE

SUMITOMO RUBBER IND LTD

CODE

SUMR

PRIORITY-DATA: 2001JP-0010487 (January 18, 2001)

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INT-CL (IPC): [B29 D 30/52](#); [B60 C 11/14](#)

ABSTRACTED-PUB-NO: JP2002210842A

## BASIC-ABSTRACT:

NOVELTY - The cut pieces (Ga,Gb) cut from a rubber sheet (Sg) to a preset width by a blade while intermittently conveying and holding with an elevatable press plate (26) are accumulated by making them adhere sequentially from the press surface (33) of a press piece (31) which intermittently presses the currently cut piece of the rubber sheet, and a lamination rubber (G0) is formed.

DETAILED DESCRIPTION - A sheet shaped lamination rubber is formed by exposing the cut surfaces of the front and back sides of each cut piece while accumulating several cut pieces cut from a strip shaped rubber sheet of extensive width containing a short fiber oriented in the width direction.

USE - For forming lamination rubber used for manufacture of pneumatic tires for vehicle.

ADVANTAGE - A lamination rubber in which the short fibers are turned to the width direction by putting to the front to back direction in order can be formed by accumulating a number of cut pieces cut from a strip shaped rubber sheet in which the fibers are oriented in the length direction efficiently and accurately. A tire which can demonstrate and excellent performance on ice from an initial stage can be obtained by using this lamination rubber.

DESCRIPTION OF DRAWING(S) - The figure shows the cutting and lamination process of a rubber sheet.

Rubber sheet Sg

Cut pieces Ga,Gb

Lamination rubber G0

Press plate 26

Press piece 31

Press surface 33

CHOSEN-DRAWING: Dwg.7/9

TITLE-TERMS: LAMINATE RUBBER FORMATION METHOD CUT PIECE RUBBER SHEET ADHERE MUTUAL PRESS SURFACE ELEVATE PRESS PIECE PRESS RUBBER SHEET INTERMITTENT

DERWENT-CLASS: A35 A95 Q11

CPI-CODES: A11-B09A2; A11-B17; A12-T01;

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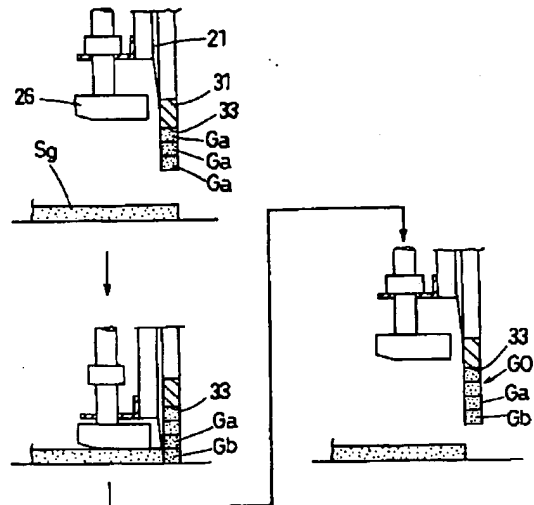
VL02 VL06 VL11 VP17 VP20

(54) 【発明の名称】 積層ゴム部材形成方法、装置、及び積層ゴム部材を用いたタイヤ

(57) 【要約】

【課題】 短繊維が長さ方向に配向するゴムシートから、短繊維が厚さ方向に向く積層ゴム部材を、効率良くかつ精度良く形成できる。

【解決手段】 間欠搬送されるゴムシートSgを、前後の押圧手段13、14により切断位置Jの前後で搬送面11S上に押圧しつつ切断する。前の押圧手段13の押圧片31は、押圧する面31Sを、切断片Gを付着させて持ち上げる保持押圧面33とし、先行して保持押圧面33に付着された先の切断片Gaを介して、次の切断片Gbを付着して積み重ねる。



## 【特許請求の範囲】

【請求項1】長さ方向に配向された短繊維を含有する広巾の帯状のゴムシートを巾方向に切断してなる切断片が、その前後の切断面を表面、裏面に露出させて積み重ねられることにより前記短繊維が表裏方向に向くシート状の積層ゴム部材を形成する積層ゴム部材形成方法であって、

長さ方向に間欠的に搬送される前記ゴムシートを、前の押圧手段、後の押圧手段の昇降可能な押圧片により切断位置の前後で搬送面上に押圧しつつ切断することによって前記切断片を形成するとともに、

前の押圧手段の押圧片は、前記ゴムシートを押圧する面を、前記切断片を付着させて持ち上げうる保持押圧面とし、

かつ先行して保持押圧面に付着された先の切断片を介して、前の押圧手段は前記ゴムシートを押圧することにより次に切断された切断片を先の切断片に付着して切断片を積み重ねることを特徴とする積層ゴム部材形成方法。

【請求項2】前の押圧手段の保持押圧面と前記ゴムシートとの間の粘着力を、前記搬送面と前記ゴムシートとの間の粘着力よりも大とすることにより、前の押圧手段の押圧による粘着により前記保持押圧面に切断片を持ち上げ可能に付着することを特徴とする請求項1記載の積層ゴム部材形成方法。

【請求項3】前記積層ゴム部材は、タイヤのトレッド形成用のタイヤゴム部材であることを特徴とする請求項1又は2記載の積層ゴム部材形成方法。

【請求項4】請求項1～3のいずれかに記載の積層ゴム部材形成方法により形成された前記積層ゴム部材を用いたタイヤ。

【請求項5】長さ方向に配向された短繊維を含有する広巾の帯状のゴムシートを巾方向に切断してなる切断片が、その前後の切断面を表面、裏面に露出させて積み重ねられることにより前記短繊維が表裏方向に向くシート状の積層ゴム部材を形成する積層ゴム部材形成装置であって、

長さ方向に間欠的に前記ゴムシートを搬送する搬送手段と、

搬送されるゴムシートを巾方向に切断し切断片を形成する切断手段と、

切断に際して切断位置の前後でゴムシートを前記搬送手段の搬送面上に押圧する昇降可能な押圧片を有する前後の押圧手段とを具え、

かつ前の押圧手段の押圧片は、前記ゴムシートを押圧する面を、前記切断片を付着させて持ち上げうる保持押圧面としたことを特徴すると積層ゴム部材形成装置。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、短繊維が長さ方向に配向する帯状ゴムシートの巾方向の切断片を、順次積

み重ねることにより、短繊維が表裏方向に向く積層ゴム部材を効率よく形成しうる積層ゴム部材形成方法、装置、及び積層ゴム部材を用いたタイヤに関する。

## 【0002】

【従来の技術】スタッドレスタイヤでは、氷上性能を向上させるために、路面掘り起こし摩擦や粘着摩擦を増加させる必要があり、従来から、トレッドゴムの氷路面に対する摩擦係数を上げる種々の研究が試みられている。その一つとして、トレッドゴム中に短繊維を配合することが提案されており、特に短繊維をタイヤ半径方向に配向させることにより、路面掘り起こし能力が高まり、より高い摩擦力が得られることが知られている。

【0003】ところで、図8(A)に示すように、トレッドゴムは、通常、カレンダーロールや押し機によって連続的に押出成形されるシート状のゴム部材gにより形成される。そのため、ゴム中の短繊維fは、ゴム流れによって押し出し方向（長さ方向）に沿って配向してしまい、このゴム部材gをそのまま用いてトレッドゴムを製造した場合、短繊維fはタイヤ周方向に沿って配向してしまうこととなる。

## 【0004】

【発明が解決しようとする課題】そこで、本出願人は、特願平11-315859号等において、図8(B)に示すように、押し出し成形された薄いゴム部材gをジグザグ状に折り畳むことを提案している。このものは、短繊維fのほとんどを厚さ方向（表裏方向）に効率よく配向できるという利点があるが、図8(C)に拡大して示す如く、トレッドゴムの表面裏面では短繊維fがどうしても寝てしまい、タイヤの使用初期から優れた氷上性能を発揮し得ないという問題がある。

【0005】従って、厚さ全体に亘って短繊維fを厚さ方向（表裏方向）に配向させるためには、図9に示す如く、押し出し成形された従来のゴム部材gを巾方向に切断し、得られた切断片g1をいったん並び替え、その切断面sを表面、裏面に露出させて積み重ねることが必要となる。そして、この切断片g1を積み重ねてなる積層ゴム部材を効率よくかつ精度良く形成するために、新規な方法及び装置が要求される。

【0006】本発明は、以上のような状況に鑑み案出されたもので、その第1の目的は、短繊維が長さ方向に配向するゴムシートの切断片を、順次積み重ねることにより、短繊維が表裏方向に向く積層ゴム部材を効率よくかつ精度良く形成しうる積層ゴム部材形成方法を提供することにある。

【0007】又第2の目的は、短繊維が長さ方向に配向するゴムシートの切断片を、順次積み重ねることにより、短繊維が表裏方向に向く積層ゴム部材を効率よくかつ精度良く形成しうる積層ゴム部材形成装置を提供することにある。

【0008】又第3の目的は、前記積層ゴム部材をトレ

ッド形成用のタイヤゴム部材として用いることにより、優れた氷上性能をタイヤの使用初期から有効に発揮し得るタイヤを提供することにある。

【0009】

【課題を解決するための手段】前記目的を達成するために、本願の請求項1の発明は、長さ方向に配向された短繊維を含有する広巾の帯状のゴムシートを巾方向に切断してなる切断片が、その前後の切断面を表面、裏面に露出させて積み重ねられることにより前記短繊維が表裏方向に向くシート状の積層ゴム部材を形成する積層ゴム部材形成方法であって、長さ方向に間欠的に搬送される前記ゴムシートを、前の押圧手段、後の押圧手段の昇降可能な押圧片により切断位置の前後で搬送面上に押圧しつつ切断することによって前記切断片を形成するとともに、前の押圧手段の押圧片は、前記ゴムシートを押圧する面を、前記切断片を付着させて持ち上げる保持押圧面とし、かつ先行して保持押圧面に付着された先の切断片を介して、前の押圧手段は前記ゴムシートを押圧することにより次に切断された切断片を先の切断片に付着して切断片を積み重ねることを特徴としている。

【0010】なお、前記保持押圧面とゴムシートとの間の粘着力を、前記搬送面とゴムシートとの間の粘着力よりも大とすることにより、前記保持押圧面に切断片を持ち上げ可能に付着させることができる。又前記積層ゴム部材は、トレッド形成用のタイヤゴム部材として用いることができる。

【0011】又請求項4は、タイヤの発明であって、請求項1～3のいずれかに記載の積層ゴム部材形成方法により形成された積層ゴム部材を用いたことを特徴としている。

【0012】又請求項5の発明は、長さ方向に配向された短繊維を含有する広巾の帯状のゴムシートを巾方向に切断してなる切断片が、その前後の切断面を表面、裏面に露出させて積み重ねられることにより前記短繊維が表裏方向に向くシート状の積層ゴム部材を形成する積層ゴム部材形成装置であって、長さ方向に間欠的に前記ゴムシートを搬送する搬送手段と、搬送されるゴムシートを巾方向に切断し切断片を形成する切断手段と、切断に際して切断位置の前後でゴムシートを前記搬送手段の搬送面上に押圧する昇降可能な押圧片を有する前後の押圧手段とを具え、かつ前の押圧手段の押圧片は、前記ゴムシートを押圧する面を、前記切断片を付着させて持ち上げる保持押圧面としたことを特徴としている。

【0013】

【発明の実施の形態】以下、本発明の実施の一形態を、図示例とともに説明する。図1は、本発明に係わる積層ゴム部材G0がトレッド形成用のタイヤゴム部材Tgとして使用された場合のタイヤ1の子午断面図である。

【0014】図1において、タイヤ1は、トレッド部2からサイドウォール部3を経てビード部4のビードコア

5に至るカーカス6と、このカーカス6のタイヤ半径方向外側かつトレッド部2の内部に配されるベルト層7とを具える。なお同図には、タイヤ1が乗用車用ラジアルタイヤである場合を例示している。

【0015】前記カーカス6は、従来と同様、カーカスコードをタイヤ周方向に対して例えば75°～90°の角度で配列した1枚以上、本例では1枚のカーカスプライ6Aから構成されており、カーカスコードとして、ナイロン、ポリエステル、レーヨン、芳香族ポリアミド等の有機繊維コード、及びスチールコード等が使用される。なおカーカス6は、その両端が前記ビードコア5の廻りで折り返して係止されるとともに、ビード部4には、前記ビードコア5からタイヤ半径方向外方にのびる断面三角形の補強用のビードエーベックスゴム8が配される。

【0016】前記ベルト層7は、ベルトコードをタイヤ周方向に対して例えば10～35°の角度で配列した2枚以上、本例では2枚のベルトプライ7A、7Bからなり、各ベルトコードがプライ間相互で交差するように、互いの傾斜の向きに違えて重畳している。なおベルトコードとして、スチールコード及び芳香族ポリアミド等の高弾性の有機繊維コードが好適に使用される。

【0017】又前記ベルト層7のタイヤ半径方向外側には、本例では、トレッド面2Sをなすキャップゴム部9aと、その半径方向内側に配されるベースゴム部9bとからなるトレッド形成用のトレッドゴム9が配される。

【0018】そして、本実施形態では、前記キャップゴム部9aを構成するタイヤゴム部材Tgに、短繊維fが表裏方向（厚さ方向）に向くシート状の積層ゴム部材G0を用いている。

【0019】ここで、前記積層ゴム部材G0は、図2に略示するように、短繊維fを押し出し方向（長さ方向）に配向させた広巾帯状のゴムシートSgを巾方向に切断し、これによって得た切断片Gを、その前後の切断面Vsを表裏面Wsに露出させて積み重ねることにより形成している。

【0020】そして、以下に、この積層ゴム部材G0を形成する積層ゴム部材形成方法（以下に形成方法という場合がある）を、それを実施する積層ゴム部材形成装置10（以下に形成装置10という場合がある）とともに説明する。なお図3は、前記形成装置10を示す側面図であり、図4、5は、その主要部を拡大して示す側面図及び斜視図である。

【0021】図3において、前記形成装置10は、前記ゴムシートSgを長さ方向に間欠的に搬送する搬送手段11と、搬送されるゴムシートSgを巾方向に切断して切断片Gを形成する切断手段12と、切断に際して切断位置Jの前後でゴムシートSgを前記搬送手段11の搬送面11S上に押圧して固定する前後の押圧手段13、14とを具える。本明細書では、搬送方向の下流側を

「前」、上流側を「後」と呼んでいる。

【0022】なお前記ゴムシートSgでは、前記図2に示す如く、カレンダーロールや押し機を用いて従来の押し出し成形することにより、ゴム材料中に含有する短繊維fが押し出し方向（長さ方向）に実質的に配向される。このゴムシートSgにおいては、その厚さTは、短繊維fの配向の容易さから1.0～3.0mmの範囲が好ましい。又ゴムシートSgの巾W及び切断片Gの切断間隔Dは、夫々、キャップゴム部9aのタイヤ軸方向巾及びタイヤ半径方向高さに相当するものであり、製造するタイヤサイズに応じて適宜設定される。

【0023】次に、前記搬送手段11は、ゴムシートSgの長さ方向に移動可能に支持される、本例では、テーブル状の搬送台15と、この搬送台15を、前記切断間隔Dに合わせて間欠移動させる移動具16とを具える場合を例示している。

【0024】前記移動具16は、前記長さ方向にのびかつ架台17上で回転自在に支持されるネジ軸19と、該ネジ軸19の一端に連結する駆動用のモータMとを具える。又前記搬送台15は、本例では、前記架台17に、例えばレールや直線軸受などの適宜の案内手段（図示しない）を介して水平移動自在に案内されており、又その下面には、前記ネジ軸19に螺合するナット部15Aを形成している。従って、搬送手段11は、前記モータMによるネジ軸19への回転制御により、前記搬送台15上のゴムシートSgを、前記切断間隔Dに合った送りピッチで、間欠的に搬送できる。

【0025】なお図中の符号20A、20Bは、前記搬送台15の移動開始位置及び移動終了位置を検出するセンサであり、移動開始位置において、搬送台15にゴムシートSgが搬入される。又搬送手段11として、ベルトコンベヤ等も好適に採用できる。

【0026】次に、前記切断手段12は、図4、5に示すように、搬送されるゴムシートSgを切断位置Jで巾方向に切断する切断ナイフ21を具える。この切断ナイフ21は、昇降具22を介して、上方の待機高さ位置から刃先が搬送面11Sに接触する切断高さ位置まで下降し、これにより、前記ゴムシートSgのうち切断位置Jより前方部分SgAを切断する。なお図1の符号28は、前記待機高さ位置を検出するセンサであり、切断後、切断手段12が待機高さ位置まで戻ったのを検出し、搬送手段11に、次の間欠送りを指示する。

【0027】なお前記昇降具22として、シリンダが好適に使用でき、そのロッド22A下端に、前記切断ナイフ21が、例えば板状のホルダ24を介して着脱自在に取り付けられる。なお本例では、前記切断ナイフ21の前面とホルダ24の前面とが面一状に連なり、互いに協同して前の押圧手段13のための垂直な案内面25を形成する場合を例示している。

【0028】次に、前記後の押圧手段14は、切断に際

し、切断位置Jの後側で前記ゴムシートSgを搬送面11Sに押圧する昇降可能な押圧片26を具える。

【0029】前記押圧片26は、ゴムシートSgへの押圧面26Sを下面に有し、前記切断ナイフ21に対して上下に相対移動可能に保持される。詳しくは、前記押圧片26は、本例では、その上面で立設するガイド軸27を有し、このガイド軸27は、前記ホルダ24の後面に取り付け上下の支持金具29U、29Lの各保持孔29Aに遊挿されて保持される。

【0030】又ガイド軸27には、下の支持金具29と当接することにより、前記相対移動の下限位置R1を規制するストッパ部27Aが設けられている。又後の押圧手段14は、例えば前記ストッパ部27Aと上の支持金具29Uとの間に介在するバネ片30を有し、これによって前記押圧片26を前記下方に付勢する。

【0031】ここで、前記下限位置R1では、押圧面26Sが前記切断ナイフ21の刃先と同高さ又は下方に突出していることが必要である。これにより、押圧片26は、切断に先駆け、バネ片30による付勢力によって前記ゴムシートSgを搬送面11Sに押圧でき、切断時の位置ズレを確実に防止できる。又押圧片26は、切断後においても、切断ナイフ21が上昇してゴムシートSgから離間するまでの間、ゴムシートSgを搬送面11Sに押し付けて固定できる。従って、切断後において、ゴムシートSgのシート本体SgB（切断位置Jより後方側の部分）が、切断ナイフ21に付着して浮き上がり位置ズレするのを防止できる。なおバネ片30による付勢力は、例えば前記上の支持金具29Uの取付け高さを調整自在とすること等によって調整できる。

【0032】次に、前記前の押圧手段13は、切断に際し、切断位置Jの前側で前記ゴムシートSgを搬送面11Sに押圧する昇降可能な押圧片31を具え、この押圧片31は、前記切断ナイフ21に対して上下に相対移動可能に保持される。

【0033】詳しくは、前記押圧片31は、本例では、ゴムシートSgへの押圧面31Sを下面に有する矩形板状をなし、前記ホルダ24に、ガイド手段32を介して前記案内面25に沿って上下に相対移動可能に保持される。

【0034】前記ガイド手段32として、本例では、前記ホルダ24の前面で突出するガイドピン32Aと、押圧片31に穿設されかつ上下にのびるとともに前記ガイドピン32Aが遊挿する長孔状のガイド溝32Bとから形成される場合を例示している。従って、前記押圧片31は、ガイド溝32Bの上端EUがガイドピン32Aに当接する下限位置Q1と、ガイド溝32Bの下端ELがガイドピン32Aに当接する上限位置との間において、前記切断ナイフ21と独立して上下に相対移動しうる。なおこの相対移動の際、押圧片31はその自重によって下方に付勢されている。

【0035】ここで、前記下限位置Q1では、押圧面31Sが前記切断ナイフ21の刃先と同高さ又は下方に突出していることが必要である。これによって、初回の切断に際し、押圧片31は、切断に先駆け、その自重によって前記ゴムシートSgを搬送面11Sに押圧でき、切断時の位置ズレを確実に防止しうる。又押圧片31は、切断後においても、切断ナイフ21が上昇してゴムシートSgから離間するまでの間、ゴムシートSgを搬送面11Sに押さえ付けて固定できる。

【0036】又前記押圧片31では、その押圧面31Sを、前記切断片Gを付着させて持ち上げる保持押圧面33として形成しており、このとき、前記保持押圧面33とゴムシートSgとの間の粘着力が、搬送面11SとゴムシートSgとの間の粘着力よりも大となるように設定することが重要である。

【0037】そのために、本例では、前記保持押圧面33に、表面研磨、硬質クロムメッキ、又は特殊材料（例えば布テープ、ビニールテープ及び両面接着テープなどのテープ類等）の貼着などによる表面処理を施し、ゴムシートSgとの粘着性を高めている。これに対して、搬送面11Sには、ゴムシートSgとの粘着性を減じるために、アドロン処理、テフロン（登録商標）コーティング処理等を施したり、又ポリエチレンなどの合成樹脂で形成したりしている。

【0038】従って、初回の切断においては、前記押圧により保持押圧面33とゴムシートSgとは強く粘着され、切断後に押圧片31が上昇する際、切断片Gは、前記粘着性の差によって、保持押圧面33に付着して一体に持ち上げられる。なお図6に初回の切断時の動作を順を追って示している。

【0039】又2回目以降の切断に際しては、図7に示すように、押圧片31は、先行して保持押圧面33に付着された先の切断片Ga...を介して、ゴムシートSgを押圧し、このゴムシートSgを固定するとともに、切断後は、次に切断された切断片Gbが先の切断片Gaに付着する。このように、前記切断を繰り返すことにより、保持押圧面33に、切断片Ga...、Gbが順次積み重なってなる一体の積層ゴム部材G0が形成される。

【0040】なお積層ゴム部材G0の積層高さの上限は、昇降具22の昇降ストローク、ガイド溝32Bの長さ、及び前記保持押圧面33と切断片Gとの粘着力の強さ等に準じて設定されるが、積み重ね精度や安定性を考慮して、積層高さの上限は20～30mm程度とするのが好ましい。

【0041】又形成された積層ゴム部材G0は、例えば作業者の手によって保持押圧面33から容易に取外すことができ、取外された各積層ゴム部材G0...を、次工程において順次重ね合わせ（図2に示す）ことによりタイヤゴム部材Tgに形成されていく。

【0042】このように、前記形成装置10及び形成方

法は、短繊維fを長さ方向に配向させた薄い帯状のゴムシートSgから、短繊維fが厚さ方向に向く積層ゴム部材G0を、効率良くかつ精度良く形成できる。なお形成される積層ゴム部材G0は、本例では、積層高さが20～30mm程度であるが、厚さDの厚いシート状となるため取り扱い性に優れ、従って、各積層ゴム部材G0...のさらなる重ね合わせなども、変形などを招くことなく能率良く行える。

【0043】又積層ゴム部材G0では、全厚さに亘って、短繊維fが厚さ方向に配向するため、トレッド形成用のタイヤゴム部材Tgとして用いることにより、タイヤの使用初期から優れた氷上性能を発揮できる。

【0044】以上、本発明の特に好ましい実施形態について詳述したが、本発明は図示の実施形態に限定されることなく、種々の態様に変形して実施しうる。

【0045】

【発明の効果】本発明は叙上の如く構成しているため、短繊維が長さ方向に配向するゴムシートの切断片を、順次積み重ねることにより、短繊維が表裏方向に向く積層ゴム部材を効率よくかつ精度良く形成しうる。

【0046】又この積層ゴム部材をトレッド形成用のタイヤゴム部材として用いることにより、優れた氷上性能をタイヤの使用初期から有効に発揮し得るタイヤを得ることができる。

【図面の簡単な説明】

【図1】本発明に係わる積層ゴム部材がトレッド形成用のタイヤゴム部材として使用された場合のタイヤの一実施例を示す断面図である。

【図2】積層ゴム部材の形成過程を説明する線図である。

【図3】積層ゴム部材形成装置を説明する側面図である。

【図4】切断手段を前後の押圧手段とともに説明する断面図である。

【図5】切断手段を前後の押圧手段とともに説明する斜視図である。

【図6】初回の切断過程を示す線図である。

【図7】2回目以降の切断過程を示す線図である。

【図8】(A)～(C)は、従来技術の問題点を説明する線図である。

【図9】従来技術の問題点を説明する線図である。

【符号の説明】

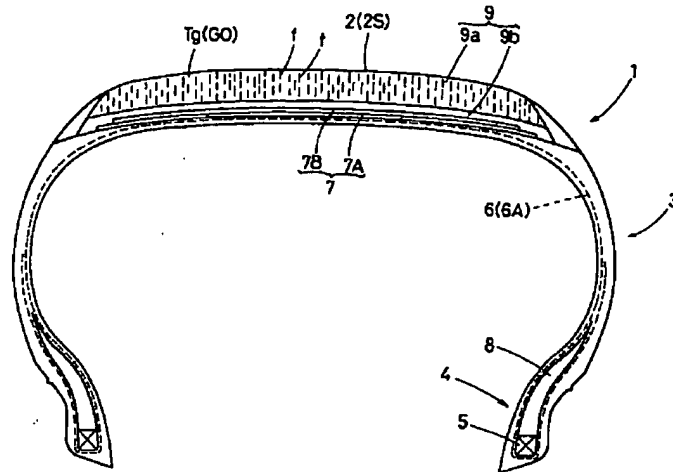
- 1      タイヤ
- 10     積層ゴム部材形成装置
- 11     搬送手段
- 12     切断手段
- 13     前の押圧手段
- 14     後の押圧手段
- 26、31   押圧片
- 33     保持押圧面



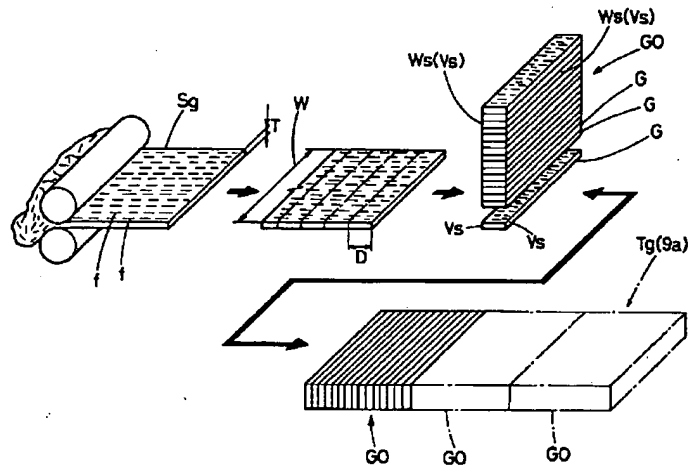
f 短繊維  
G 切断片  
GO 積層ゴム部材  
J 切断位置

Sg ゴムシート  
Tg タイヤゴム部材  
Vs 前後の切断面  
Ws 表裏面

【図1】

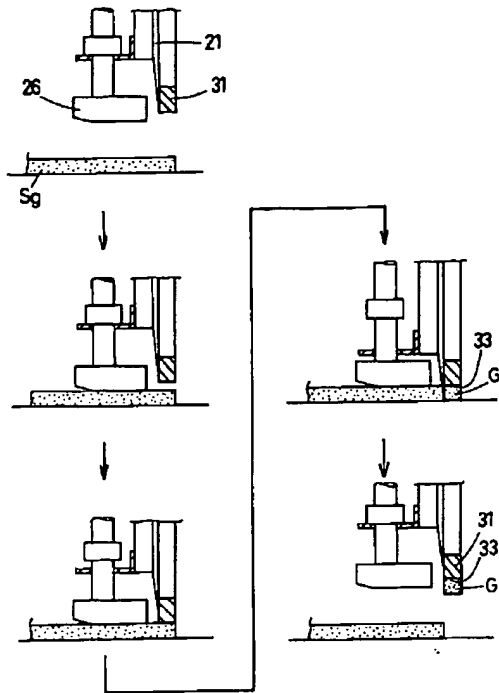


【図2】

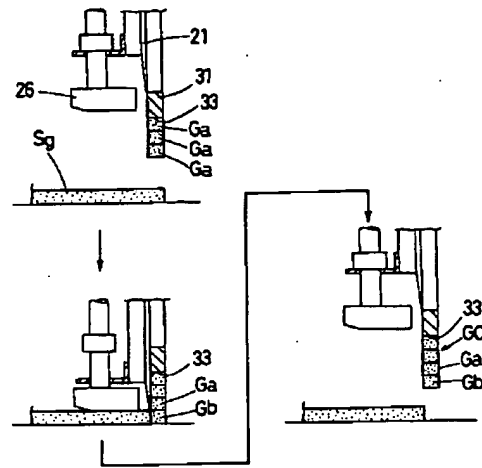




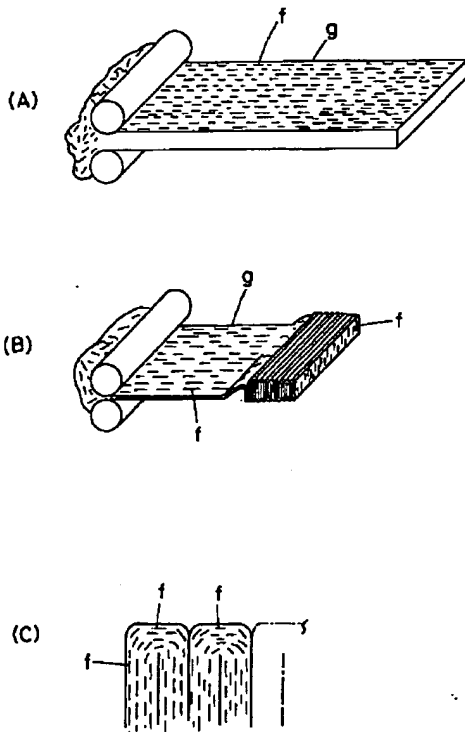
【図6】



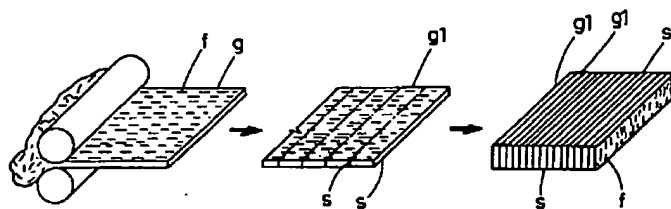
【図7】



【図8】



【図9】



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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the laminating rubber member formation approach which can form efficiently the laminating rubber member which a staple fiber turns to in the direction of a front flesh side, equipment, and the tire using a laminating rubber member by accumulating the piece of cutting of the cross direction of the band-like rubber sheet in which a staple fiber carries out orientation in the die-length direction one by one.

[0002]

[Description of the Prior Art] In the studless tire, in order to raise the Hikami engine performance, it is necessary to make road surface digging-up friction and sticking friction increase, and the various researches which raise coefficient of friction to the ice road surface of tread rubber are tried from the former. As one of them, when blending a staple fiber into tread rubber is proposed and it carries out orientation especially of the staple fiber to the tire radial, road surface digging-up capacity increases and it is known that higher frictional force will be acquired.

[0003] By the way, as shown in drawing 8 (A), tread rubber is usually formed of the rubber member g of the shape of a sheet by which extrusion molding is continuously carried out with a calendering roll or an extruder. Therefore, when orientation of the staple fiber f in rubber is carried out along the direction of extrusion (the die-length direction) by rubber flow and tread rubber is manufactured, using this rubber member g as it is, orientation of the staple fiber f will be carried out along a tire hoop direction.

[0004]

[Problem(s) to be Solved by the Invention] Then, in Japanese Patent Application No. No. 315859 [ 11 to ] etc., these people have proposed folding up the thin rubber member g by which extrusion molding was carried out in the shape of zigzag, as shown in drawing 8 (B). Although this thing has the advantage that most staple fibers f can carry out orientation in the thickness direction (the direction of a front flesh side) efficiently, with the surface rear face of tread rubber, a staple fiber f lies down inevitably and there is a problem that the Hikami engine performance which was excellent from the use early stages of a tire cannot be demonstrated so that it may expand to drawing 8 (C) and may be shown.

[0005] Therefore, in order to cover the whole thickness and to make the orientation of the staple fiber f carry out in the thickness direction (the direction of a front flesh side), as shown in drawing 9, it is necessary to cut the conventional rubber member g by which extrusion molding was carried out to a cross direction, to once rearrange the obtained piece g1 of cutting, to expose the cutting plane s at a front face and the rear face, and to put. And in order to form the laminating rubber member which comes to put this piece g1 of cutting with an efficiently and sufficient precision, a new approach and equipment are required.

[0006] think out this invention in view of the above situations -- it is \*\* and the 1st purpose is in offering the laminating rubber member formation approach which can form the laminating rubber member which a staple fiber turns to in the direction of a front flesh side with an efficiently and sufficient precision by accumulating the piece of cutting of the rubber sheet in which a staple fiber carries out orientation in the die-length direction one by one.

[0007] The purpose of \*\*\*\* 2 is by accumulating the piece of cutting of the rubber sheet in which a staple fiber carries out orientation in the die-length direction one by one to offer the laminating rubber member formation equipment which can form the laminating rubber member which a staple fiber turns to in the direction of a front flesh side with an efficiently and sufficient precision.

[0008] The purpose of \*\*\*\* 3 is by using said laminating rubber member as a tire rubber member for tread formation to offer the tire which can demonstrate the outstanding Hikami engine performance effectively from the use early stages of a tire.

[0009]

[Means for Solving the Problem] In order to attain said purpose, invention of claim 1 of this application The piece of cutting which comes to cut the wide band-like rubber sheet containing the staple fiber by which orientation was carried out in the die-length direction to a cross direction It is the laminating rubber member formation approach which forms the laminating rubber member of the shape of a sheet by which said staple fiber is suitable in the direction of a front flesh side by exposing the cutting plane before and behind that at a front face and the rear face, and being put. While forming said piece of cutting by cutting it, pressing said rubber sheet intermittently conveyed in the die-length direction on a conveyance side before and behind a cutting location by the piece of press which can go up and down a front press means and a next press means The piece of cutting of the point to which the piece of press of a front press means considered as the maintenance press side which said piece of cutting is made to adhere and can raise the field which presses said rubber sheet, and it preceded with and adhered in the maintenance press

side is minded. The front press means is characterized by adhering the piece of cutting cut next to the previous piece of cutting, and accumulating the piece of cutting by pressing said rubber sheet.

[0010] In addition, the piece of cutting can be raised to said maintenance press side, and it can be made to adhere to it possible by making adhesion between said maintenance press sides and rubber sheets into size rather than the adhesion between said conveyance sides and rubber sheets. Moreover, said laminating rubber member can be used as a tire rubber member for tread formation.

[0011] Moreover, claim 4 is invention of a tire and is characterized by using the laminating rubber member formed by the laminating rubber member formation approach according to claim 1 to 3.

[0012] Moreover, the piece of cutting which comes to cut the wide band-like rubber sheet containing the staple fiber by which orientation was carried out in the die-length direction to a cross direction invention of claim 5 It is laminating rubber member formation equipment which forms the laminating rubber member of the shape of a sheet by which said staple fiber is suitable in the direction of a front flesh side by exposing the cutting plane before and behind that at a front face and the rear face, and being put. A conveyance means to convey said rubber sheet intermittently in the die-length direction, and a cutting means to cut the rubber sheet conveyed to a cross direction, and to form the piece of cutting. It has a press means before and after having the piece of press which presses a rubber sheet on the conveyance side of said conveyance means before and behind a cutting location on the occasion of cutting and which can be gone up and down. And the piece of press of a front press means It is characterized by considering as the maintenance press side which said piece of cutting is made to adhere and can raise the field which presses said rubber sheet.

[0013]

[Embodiment of the Invention] Hereafter, one gestalt of operation of this invention is explained with the example of illustration.

Drawing 1 is the meridional sectional view of the tire 1 when the laminating rubber member G0 concerning this invention is used as a tire rubber member Tg for tread formation.

[0014] A tire 1 is equipped with the belt layer 7 allotted to the interior of the tread section 2 to the tire radial outside of the carcass 6 which results in the bead core 5 of a toe of bead 4 through the sidewall section 3, and this carcass 6 and the tread section 2 in drawing 1. In addition, in this drawing, the case where a tire 1 is a radial-ply tire for passenger cars is illustrated.

[0015] Said carcass 6 is constituted from carcass ply of one sheet 6A by one or more sheets which arranged the carcass code at the include angle of 75 degrees - 90 degrees as opposed to the tire hoop direction, and this example as usual, and organic fiber codes, such as nylon, polyester, rayon, and aromatic polyamide, a steel code, etc. are used as a carcass code. In addition, while the both ends turn up a carcass 6 around said bead core 5 and it is stopped, bead APEC SUGOMU 8 for reinforcement of the shape of a cross-section triangle extended from said bead core 5 to the method of the outside of tire radial is allotted to a toe of bead 4.

[0016] By two or more sheets which arranged the belt at the include angle of 10-35 degrees as opposed to the tire hoop direction, and this example, said belt layer 7 consists of belt plies 7A and 7B of two sheets, and it is dislocated and superposed on the sense of a mutual inclination so that each belt may cross by the mutual one between plies. In addition, as a belt, the organic fiber code of high elasticity, such as a steel code and aromatic polyamide, is used suitably.

[0017] Moreover, by this example, the tread rubber 9 for tread formation which consists of cap rubber section 9a which makes tread side 2S, and base rubber section 9b allotted to the radial inside is allotted to the tire radial outside of said belt layer 7.

[0018] And with this operation gestalt, the laminating rubber member G0 of the shape of a sheet by which a staple fiber f is suitable in the direction of a front flesh side (the thickness direction) is used for the tire rubber member Tg which constitutes said cap rubber section 9a.

[0019] Here, said laminating rubber member G0 cuts the wide band-like rubber sheet Sg to which the orientation of the staple fiber f was made to carry out in the direction of extrusion (the die-length direction) to a cross direction, and forms it by exposing the cutting plane Vs before and behind that at the front rear face Ws, and accumulating the piece G of cutting obtained by this so that it may sketch in drawing 2.

[0020] And the laminating rubber member formation approach (the formation approach may be told to below) which forms this laminating rubber member G0 in below is explained with the laminating rubber member formation equipment 10 (formation equipment 10 may be told to below) which carries it out. In addition, drawing 3 is the side elevation showing said formation equipment 10, and drawing 4 and 5 are the side elevations and perspective views expanding and showing the principal part.

[0021] Said formation equipment 10 is equipped with a conveyance means 11 to convey said rubber sheet Sg intermittently in the die-length direction, a cutting means 12 to cut the rubber sheet Sg conveyed to a cross direction, and to form the piece G of cutting, and the press means 13 and 14 before and after pressing a rubber sheet Sg on conveyance side 11S of said conveyance means 11 and fixing before and behind the cutting location J on the occasion of cutting, in drawing 3. On these specifications, the downstream of the conveyance direction is called a "front" and the upstream is called the "back."

[0022] In addition, in said rubber sheet Sg, as shown in said drawing 2, orientation of the staple fiber f contained in a rubber ingredient is substantially carried out in the direction of extrusion (the die-length direction) by carrying out extrusion molding in former using a calendaring roll or an extruder. In this rubber sheet Sg, that thickness T has the desirable range of 1.0-3.0mm from the ease of the orientation of a staple fiber f. Moreover, the width W of a rubber sheet Sg and the cutting spacing D of the piece G of cutting are equivalent to the tire shaft-orientations width and the tire radial height of cap rubber section 9a, and are suitably set up according to the tire size to manufacture, respectively.

[0023] Next, said conveyance means 11 has illustrated the case where it has the migration implement 16 which carries out intermittent migration of table-like the conveyance base 15 and this conveyance base 15 according to said cutting spacing D, in



this example supported movable in the die-length direction of a rubber sheet Sg.

[0024] Said migration implement 16 is equipped with the motor M for a drive connected with the end of the screw shaft 19 supported free [ rotation ] on mileage and a stand 17 in said die-length direction, and this screw shaft 19. Moreover, in this example, said conveyance base 15 is shown free [ horizontal migration ] through proper guidance means (not shown), such as a rail and straight-line bearing, at said stand 17, and forms in the inferior surface of tongue nut section 15A screwed in said screw shaft 19. Therefore, by the roll control to the screw shaft 19 by said motor M, the conveyance means 11 is a delivery pitch suitable for said cutting spacing D, and can convey intermittently the rubber sheet Sg on said conveyance base 15.

[0025] In addition, the signs 20A and 20B in drawing are sensors which detect the migration starting position and migration termination location of said conveyance base 15, and a rubber sheet Sg is carried in to the conveyance base 15 in a migration starting position. Moreover, as a conveyance means 11, a band conveyor etc. is suitably employable.

[0026] Next, said cutting means 12 is equipped with the cutting knife 21 which cuts the rubber sheet Sg conveyed to a cross direction in the cutting location J as shown in drawing 4 and 5. This cutting knife 21 descends through the rise-and-fall implement 22 to the cutting height location where the edge of a blade contacts conveyance side 11S from an upper standby height location, and, thereby, cuts the front part SgA from the cutting location J among said rubber sheets Sg. In addition, the sign 28 of drawing 1 is a sensor which detects said standby height location, detects after cutting that the cutting means 12 returned to the standby height location, and directs the following intermittent feed for the conveyance means 11.

[0027] In addition, as said rise-and-fall implement 22, a cylinder can use it suitably and said cutting knife 21 is attached in the rod 22A lower limit free [ attachment and detachment ] through the tabular holder 24. In addition, in this example, the front face of said cutting knife 21 and the front face of a holder 24 stood in a row in the shape of flat-tapped, and the case where the perpendicular slideway 25 for the front press means 13 is formed cooperatively mutually is illustrated.

[0028] Next, the press means 14 of said back is equipped with the piece 26 of press which presses said rubber sheet Sg to conveyance side 11S by the side behind the cutting location J and which can be gone up and down on the occasion of cutting.

[0029] Said piece 26 of press has press side 26S to a rubber sheet Sg on the inferior surface of tongue, and is held possible relative displacement ] up and down to said cutting knife 21. In detail, by this example, said piece 26 of press has the guide shaft 27 set up on that top face, and this guide shaft 27 is loosely inserted in each maintenance hole 29A of the up-and-down dummy support 29U and 29L which clings to the rear face of said holder 24, and it is held.

[0030] Moreover, stopper section 27A which regulates the minimum location R1 of said relative displacement is \*\*\*\*(ed) by contacting the lower dummy support 29 by the guide shaft 27. Moreover, the next press means 14 has the piece 30 of a spring which intervenes between said stopper section 27A and upper dummy support 29U, and energizes said piece 26 of press in said lower part by this.

[0031] Here, it is required the edge of a blade of said cutting knife 21, this height, or for press side 26S to have projected caudad in said minimum location R1. Thereby, the piece 26 of press takes the initiative in cutting, according to the energization force by the piece 30 of a spring, can press said rubber sheet Sg to conveyance side 11S, and can prevent the location gap at the time of cutting certainly. Moreover, a rubber sheet Sg is pressed down to conveyance side 11S, and the piece 26 of press is fixable until the cutting knife 21 goes up and it estranges it from a rubber sheet Sg after cutting. Therefore, it can prevent that the body SgB (it is a part by the side of back from the cutting location J) of a sheet of a rubber sheet Sg adheres to the cutting knife 21, and comes floating and carries out location gap after cutting. In addition, the energization force by the piece 30 of a spring can be adjusted by enabling adjustment of the anchoring height of dummy support 29U of said top, for example etc.

[0032] Next, the press means 13 of said front is equipped with the piece 31 of press which presses said rubber sheet Sg to conveyance side 11S by the before [ the cutting location J ] side and which can be gone up and down on the occasion of cutting, and this piece 31 of press is held possible [ relative displacement ] up and down to said cutting knife 21.

[0033] In detail, said piece 31 of press is held possible [ relative displacement ] up and down along with said slideway 25 by this example at nothing and said holder 24 through the guide means 32 in the rectangle tabular which has press side 31S to a rubber sheet Sg on the inferior surface of tongue.

[0034] As said guide means 32, by this example, while guide pin 32A which projects in the front face of said holder 24, and the piece 31 of press are punctured and being extended up and down, the case where it is formed from guide slot 32B of the shape of a long hole which said guide pin 32A inserts is illustrated. Therefore, said piece 31 of press can be displaced relatively independently up and down with said cutting knife 21 between the minimum location Q1 where the upper limit EU of guide slot 32B contacts guide pin 32A, and the upper limit location where the lower limit EL of guide slot 32B contacts guide pin 32A. In addition, the piece 31 of press is caudad energized by that self-weight in the case of this relative displacement.

[0035] Here, it is required the edge of a blade of said cutting knife 21, this height, or for press side 31S to have projected caudad in said minimum location Q1. By this, on the occasion of first-time cutting, the piece 31 of press takes the initiative in cutting, said rubber sheet Sg can be pressed to conveyance side 11S with the self-weight, and the location gap at the time of cutting can be prevented certainly. Moreover, a rubber sheet Sg is pressed down to conveyance side 11S, and the piece 31 of press is fixable until the cutting knife 21 goes up and it estranges it from a rubber sheet Sg after cutting.

[0036] Moreover, in said piece 31 of press, it forms as a maintenance press side 33 which said piece G of cutting is made to adhere, and can raise those press side 31S, and it is important at this time to set up so that the adhesion between said maintenance press sides 33 and rubber sheets Sg may serve as size from the adhesion between conveyance side 11S and a rubber sheet Sg.

[0037] Therefore, in this example, surface treatment by attachment of surface polish, hard chrome plating, or exotic materials, such as for example, tapes, such as a cloth tape, a vinyl tape, and a double faced adhesive tape, etc. is performed to said

maintenance press side 33, and adhesiveness with a rubber sheet Sg is raised to it. On the other hand, in order to reduce adhesiveness with a rubber sheet Sg, ADORON processing, Teflon (trademark) coating processing, etc. are performed to conveyance side 11S, and it forms in them with synthetic resin, such as polyethylene.

[0038] Therefore, in first-time cutting, in case the maintenance press side 33 and a rubber sheet Sg stick strongly by said press and the piece 31 of press goes up after cutting, according to said adhesive difference, the piece G of cutting adheres to the maintenance press side 33, and is raised by one. In addition, order is shown for the actuation at the time of first-time cutting in drawing 6 later on.

[0039] Moreover, on the occasion of cutting of the 2nd henceforth, it is the piece Ga of cutting of the point to which the piece 31 of press preceded with as shown in drawing 7, and it adhered in the maintenance press side 33... While minding, pressing a rubber sheet Sg and fixing this rubber sheet Sg, the piece Gb of cutting cut next adheres to the previous piece Ga of cutting after cutting. thus, the thing for which said cutting is repeated -- the maintenance press side 33 -- the piece Ga of cutting -- the laminating rubber member G0 of one to which ... and Gb come to be piled up one by one is formed.

[0040] In addition, although the upper limit of the laminating height of the laminating rubber member G0 is set up according to the strength of the elevating length of the rise-and-fall implement 22, the die length of guide slot 32B, and the adhesion of said maintenance press side 33 and piece G of cutting etc., it is desirable to set the upper limit of laminating height to about 20-30mm in consideration of pile precision or stability.

[0041] Moreover, the formed laminating rubber member G0 is each laminating rubber member G0 which could demount easily and was demounted by an operator's hand from the maintenance press side 33... It is formed in the tire rubber member Tg of what is piled up one by one in degree process (shown in drawing 2).

[0042] Thus, said formation equipment 10 and the formation approach can form the laminating rubber member G0 which a staple fiber f turns to in the thickness direction with an efficiently and sufficient precision from the thin band-like rubber sheet Sg to which the orientation of the staple fiber f was made to carry out in the die-length direction. In addition, although laminating height is about 20-30mm, since it becomes the shape of a thick sheet of thickness D, it excels in this example at handling nature, therefore the laminating rubber member G0 formed is each laminating rubber member G0... Further superposition etc. can be performed well, without causing deformation etc.

[0043] Moreover, in the laminating rubber member G0, since total thickness is covered and a staple fiber f carries out orientation in the thickness direction, the Hikami engine performance which was excellent from the use early stages of a tire can be demonstrated by using as a tire rubber member Tg for tread formation.

[0044] As mentioned above, although especially the desirable operation gestalt of this invention was explained in full detail, without being limited to the operation gestalt of illustration, it deforms into various modes and this invention can be carried out.

[0045]

[Effect of the Invention] Since this invention is constituted like the above statement, it can form the laminating rubber member which a staple fiber turns to in the direction of a front flesh side with an efficiently and sufficient precision by accumulating the piece of cutting of the rubber sheet in which a staple fiber carries out orientation in the die-length direction one by one.

[0046] Moreover, by using this laminating rubber member as a tire rubber member for tread formation, the tire which can demonstrate the outstanding Hikami engine performance effectively from the use early stages of a tire can be obtained.

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[Translation done.]



**\* NOTICES \***

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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**CLAIMS**

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[Claim(s)]

[Claim 1] The piece of cutting which comes to cut the wide band-like rubber sheet containing the staple fiber by which orientation was carried out in the die-length direction to a cross direction It is the laminating rubber member formation approach which forms the laminating rubber member of the shape of a sheet by which said staple fiber is suitable in the direction of a front flesh side by exposing the cutting plane before and behind that at a front face and the rear face, and being put. While forming said piece of cutting by cutting it, pressing said rubber sheet intermittently conveyed in the die-length direction on a conveyance side before and behind a cutting location by the piece of press which can go up and down a front press means and a next press means The piece of cutting of the point to which the piece of press of a front press means considered as the maintenance press side which said piece of cutting is made to adhere and can raise the field which presses said rubber sheet, and it preceded with and adhered in the maintenance press side is minded. A front press means is the laminating rubber member formation approach characterized by adhering the piece of cutting cut next to the previous piece of cutting, and accumulating the piece of cutting by pressing said rubber sheet.

[Claim 2] The laminating rubber member formation approach according to claim 1 characterized by raising the piece of cutting to said maintenance press side by adhesion by press of a front press means, and adhering possible by making adhesion between the maintenance press side of a front press means, and said rubber sheet into size rather than the adhesion between said conveyance sides and said rubber sheets.

[Claim 3] Said laminating rubber member is the laminating rubber member formation approach according to claim 1 or 2 characterized by being a tire rubber member for tread formation of a tire.

[Claim 4] The tire using said laminating rubber member formed by the laminating rubber member formation approach according to claim 1 to 3.

[Claim 5] The piece of cutting which comes to cut the wide band-like rubber sheet containing the staple fiber by which orientation was carried out in the die-length direction to a cross direction It is laminating rubber member formation equipment which forms the laminating rubber member of the shape of a sheet by which said staple fiber is suitable in the direction of a front flesh side by exposing the cutting plane before and behind that at a front face and the rear face, and being put. A conveyance means to convey said rubber sheet intermittently in the die-length direction, and a cutting means to cut the rubber sheet conveyed to a cross direction, and to form the piece of cutting. It has a press means before and after having the piece of press which presses a rubber sheet on the conveyance side of said conveyance means before and behind a cutting location on the occasion of cutting and which can be gone up and down. And the piece of press of a front press means When characterized by considering as the maintenance press side which said piece of cutting is made to adhere and can raise the field which presses said rubber sheet, it is laminating rubber member formation equipment.

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[Translation done.]